MULTIMEDIA UNIVERSITY

STUDENT IDENTIFICATION NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2019/2020

BMR3174 – SUPPLY CHAIN MANAGEMENT

(All Sections/Groups)

14 MARCH 2019
9.00 a.m. - 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This Question paper consists of 11 pages with 2 Sections only.
2. **Section A:** Answer all **TWO (2)** questions.

   Section B: Answer any **TWO (2)** of the **THREE (3)** questions.
3. The distribution of the marks for each question is given at the end of each question.
4. Please write all your answers in the Answer Booklet provided.

SECTION A: ANSWER ALL QUESTIONS (50 MARKS)

QUESTION 1

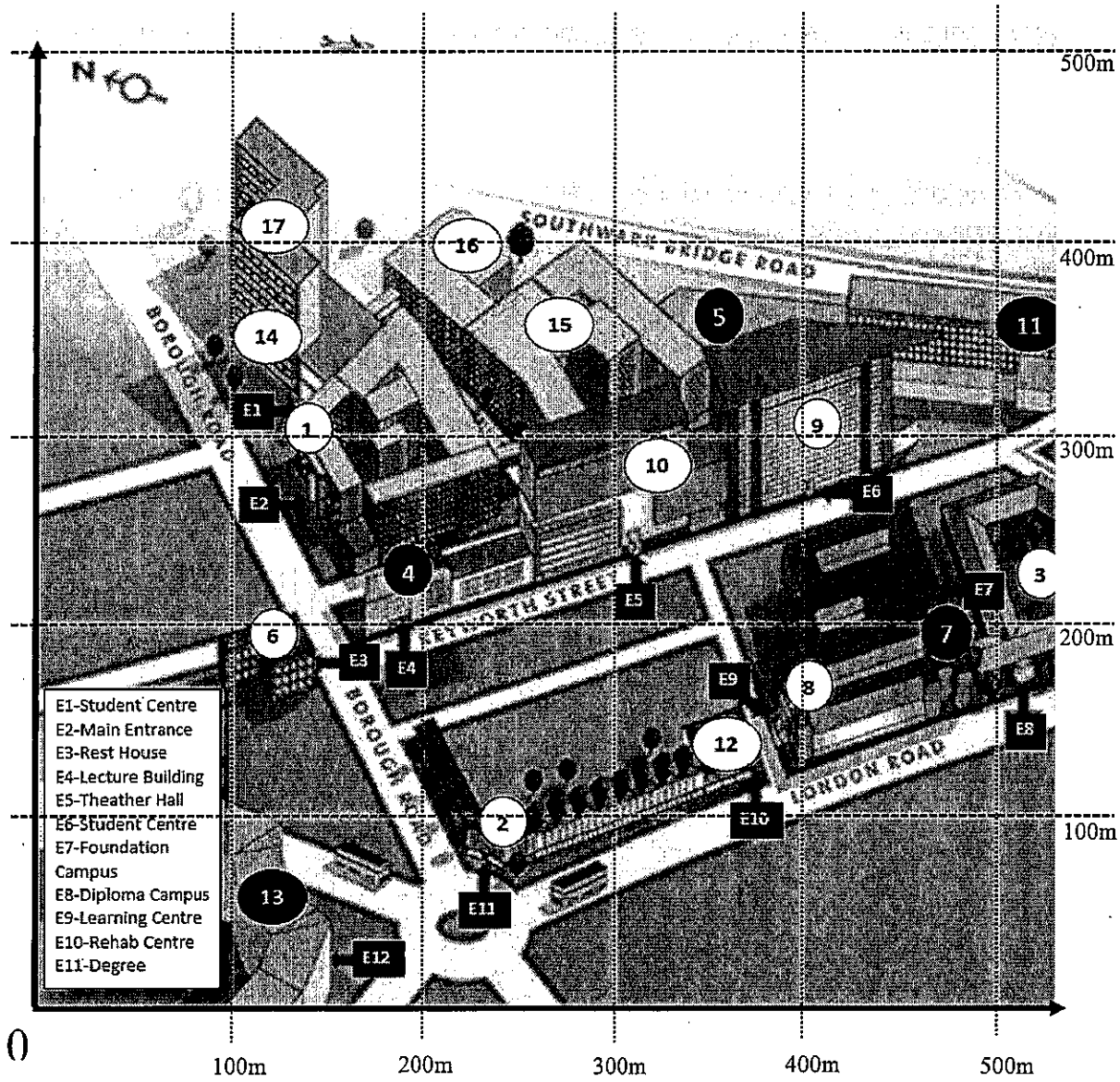

Figure 1.1

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QUESTION 1

Yasri is looking for a single central location to make ketupat for delivery only. The town is arranged as shown in **Figure 1.1**. Yasri is currently delivering ketupat to five locations (Location No: **4, 13, 5, 11,** and **7**). The location **4** is the source of 4,000 ketupat orders per week. Location **13** and **5** require 2,000 ketupat per week. Meanwhile location **11** needs 1,000 per week. In addition, the location **7** orders 3,000 ketupat per week.

Note: Assume the assigned number as the centre point of location.

a) At about which location should Yasri start looking for a new suitable site. (Estimate for the coordinates accurate nearest to 25m, e.g. 25m, 50m, 75m, 100m, 125m..., and find the centre of gravity).

(10 marks)

b) What is the rectilinear weekly load-distance score for this location (centre of gravity) to the location no. **4, 13, 5, 11** and **7** ?

(5 marks)

c) If the location of (a) is not available and the location no. 9, 10 and 12 are available, using rectilinear distances, which location is closer to the site located in (a).

(5 marks)

d) If Yasri can delivery ketupat in 2 minutes per 100m, going from the center of gravity location to the demand location no. **17** and then to location no. **3** will take how long?

(5 marks)

[Total: 25 marks]

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QUESTION 2

ManiFun@MMU is considering a new start-up business. The activities that would have to be completed before beginning the business are listed below:

Table 2.1: Activities for a new start-up business

Activity	Description	Immediate Predecessor	Normal Cost (RM)	Crash Cost (RM)	Normal Time (Days)	Crash Time (Days)
A	Survey surrounding environment	None	100	800	3	1
B	Develop initial design	A	400	400	1	1
C	Obtain management approval	A	200	200	2	2
D	Select team leader	B, C	300	600	7	5
E	Establish budget	C	250	380	5	4
F	Finalise design	C	150	300	3	2
G	Hire workers	E	450	810	7	4
H	Train workers	E, F	300	360	5	4
I	Test market	D, G, H	800	1850	8	5

Solve the following:

a) Draw a precedence diagram for the new start-up. How many days are required to complete the start-up?

(5 marks)

b) Compute the earliest start times, earliest finish times, latest start times, latest finish times and slack times. Write these values in the precedence diagram

(10 Marks)

c) Every day of delay in the start-up costs RM150. Assume ManiFun@MMU wants to complete the start-up early. What crashing decisions would you recommend? If so, which activity and how much would ManiFun@MMU save?

(10 Marks)

[Total: 25 marks]

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SECTION B: ANSWER ANY TWO (2) QUESTIONS

QUESTION 3

Mr Kingsley, the XYZ's dean has a new operation room under consideration for student's registration and application related matters. You have been asked to evaluate the operation layout based on the information given. There are **SIX (6)** workstations **(Table 3.1)** and the number of trips as below:

Table 3.1: Number of trips between workstations

To / From	Counter Service **(CS)**	Checking status **(PT)**	Enrolling new subject **(KI)**	Retrieving Forms **(RF)**	Printing Forms **(PF)**	Validating the forms **(VF)**
CS	-					
PT	23	-				
KI	24	52	-			
RF	13	5	17	-		
PF	21	56	28	25	-	
VF	60	15	57	3	42	-

The Existing Layout is arranged as per Figure 3.1 and each area is labelled in alphabetic order (A, B, C, D, E etc).

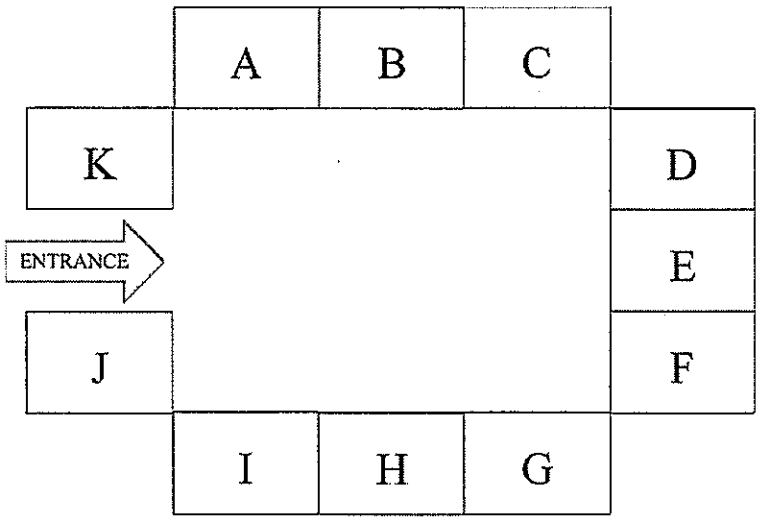

Figure 3.1

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Table 3.2: Distance Between the Figure 3.1's Layout Areas (meters)

	A	B	C	D	E	F	G	H	I	J
A	0									
B	10	0								
C	15	10	0							
D	20	15	10	0						
E	25	20	15	10	0					
F	30	25	20	15	10	0				
G	30	25	25	20	15	10	0			
H	25	20	30	25	20	15	10	0		
I	20	25	35	30	25	20	15	10	0	
J	20	25	35	40	35	35	20	15	10	0
K	10	15	30	35	35	40	35	25	20	15

a) Based on the existing layout (Figure 3.1), propose the best arrangement for the **SIX (6)** workstations. Students are required to follow the layout of Figure 3.1 and fit each workstation into a suitable area.

(10 marks)

b) Calculate its total weighted distance score. The total load-distance of the new arrangement should not exceed 7200.

(15 marks)

[Total: 25 marks]

QUESTION 4

Table 4.1 shows XYZ company's aggregate demand for the next 8 months and the initial operating cost. Currently the XYZ company is engaging 20 workers. The operating cost is detailed in Table 4.2. A worker can produce an average of 800 regular production units per month. Each worker puts in 160 regular production hours per month. Payroll costs are RM 1,280.00 per worker for regular production units per month.

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Table 4.1: Forecast Aggregate Demand

Month	Jan	February	March	April	May	June	July	August
Demand	14000	16000	18000	18000	22000	22000	18000	14000

Table 4.2: Operating Cost

Previous quarter's output	16000 units
Beginning inventory	2000 units
Stockout cost	RM100.00 per unit
Inventory holding cost	RM10.00 per unit at end of month
Hiring workers	RM3200.00 per worker
Firing workers	RM6400.00 per worker
Subcontracting cost	RM75.00 per unit
Unit cost (Material)	RM30.00 per unit (Regular and Overtime Unit)
Overtime	RM12.00 per overtime hour. **Overtime is limited to the maximum 20% of regular production hours per month.**

Solve the following production plan:

a) Plan A—level strategy, calling for a one-time adjustment of the workforce before month Jan begins. **The warehouse now constraints the maximum allowable inventory on hand at the end of month to 8,000 units or less.** Stockout and Subcontracting options are not permitted.

(12 marks)

b) Plan B—Mixed strategy. The company has to use Chase Strategy for the first four months and follow with Level Strategy for another four months. **Warehouse can keep 10,000 units** or less per month regardless of Chase or Level Strategy up to month May. However, the company has to keep **4,000 units OR less as closing inventory** at the end of month August. The company limits the maximum allowable **Stockout and Subcontracting to 50 units each** for the entire period. **The total number of hiring must match (equal) the total number of firing.**

(13 marks)
[Total: 25 marks]

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QUESTION 5

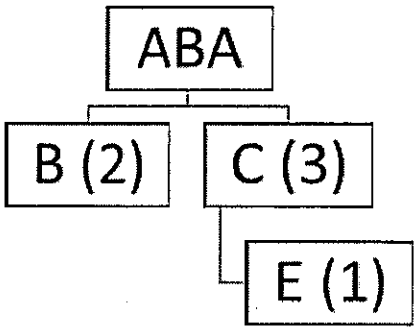

Figure 5.1:
Product Structure for the Item ABA

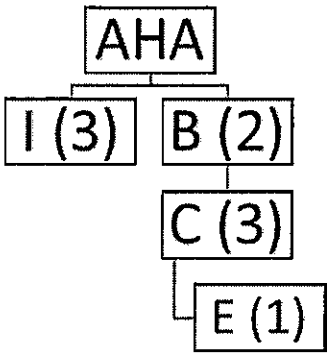

Figure 5.2:
Product Structure for the Item AHA

Table 5.1: Forecast demand and Booked orders for Item ABA

Week	1	2	3	4	5	6	7	8
Forecast demand (unit)	0	25	10	0	20	50	0	70
Booked orders (unit)	0	15	10	0	40	20	0	60

Table 5.2: Forecast demand and Booked orders for Item AHA

Week	1	2	3	4	5	6	7	8
Forecast demand (unit)	90	0	20	30	15	35	0	0
Booked orders (unit)	80	0	10	20	10	45	0	0

Table 5.3: Inventory Record Data

Description	**Product**		**Part**			
Data Category	**ABA**	**AHA**	**B**	**C**	**E**	**I**
Lot Sizing Rule	FOQ = 35	FOQ = 50	FOQ = 200	POQ = 2	L4L	FOQ = 200
Lead Time (wk)	1	2	1	1	2	1
Scheduled Receipts				Wk 2 = 690		Wk 1 = 200
Beginning Inventory	86	50	75	50	30	120

Continued...

The forecast demand, booked orders and product structures for Item ABA and AHA are provided in Figures 5.1 and 5.2, and Tables 5.1, 5.2 and 5.3. The inventory data indicated different order requirements for each product and part. (Students are required to apply the Table A and B provided in the question booklet, and attach them together with the answer booklet for submission).

Plan the following:

a) Complete the Master Production Schedule for Item ABA and AHA (MPS)

(12 marks)

b) Suppose a customer in Kuala Lumpur calls and says he is facing a shortage of AHA. It needs 40 units as soon as possible. Assuming you can make no changes to the MPS quantities or order booked, how quickly can it get the customer 40 units? Specify the quantities you can deliver and when.

(3 marks)

c) Complete the Material Requirement Planning for Part B.

(5 marks)

d) Complete the Material Requirement Planning for Part C.

(5 marks)

[Total: 25 marks]

Continued...

Table A: Master Production Schedule for Item _____

Lot size:	Week											
Lead Time:												
Forecast												
Customer Orders												
Stock On hand: 86												
MPS quantity												
MPS start												
Available to promise (ATP)												

Table A: Master Production Schedule for Item _____

Lot size:	Week											
Lead Time:												
Forecast												
Customer Orders												
Stock On hand: 86												
MPS quantity												
MPS start												
Available to promise (ATP)												

Table A: Master Production Schedule for Item _____

Lot size:	Week											
Lead Time:												
Forecast												
Customer Orders												
Stock On hand: 86												
MPS quantity												
MPS start												
Available to promise (ATP)												

Continued...

Table B: Material Requirement Planning for _____

Lot Size:	Week											
Lead Time:												
Gross requirements												
Scheduled receipts												
On hand inventory												
Planned order receipts												
Planned order releases												

Table B: Material Requirement Planning for _____

Lot Size:	Week											
Lead Time:												
Gross requirements												
Scheduled receipts												
On hand inventory												
Planned order receipts												
Planned order releases												

Table B: Material Requirement Planning for _____

Lot Size:	Week											
Lead Time:												
Gross requirements												
Scheduled receipts												
On hand inventory												
Planned order receipts												
Planned order releases												

Continued...

Table B: Material Requirement Planning for _____

Lot Size:	Week											
Lead Time:												
Gross requirements												
Scheduled receipts												
On hand inventory												
Planned order receipts												
Planned order releases												

Table B: Material Requirement Planning for _____

Lot Size:	Week											
Lead Time:												
Gross requirements												
Scheduled receipts												
On hand inventory												
Planned order receipts												
Planned order releases												

Table B: Material Requirement Planning for _____

Lot Size:	Week											
Lead Time:												
Gross requirements												
Scheduled receipts												
On hand inventory												
Planned order receipts												
Planned order releases												

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